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Abstract

Background

This study compares the health status, preventive behaviour and risk factors of female nurses with those of other employed postsecondary-educated women.

Data and methods

Cross-sectional data from the 2003 Canadian Community Health Survey were analyzed. Multiple logistic regression analyses were conducted to adjust for potential confounding by demographic and socio-economic characteristics.

Results

When confounding by demographic and socio-economic characteristics was taken into account, nurses were more likely than other employed postsecondary-educated women to report back problems, that most work days were "quite a bit" or "extremely" stressful, and having had flu immunizations and cervical cancer screening. They were less likely to report insufficient consumption of vegetables and fruit or heavy alcohol use.

Interpretation

Canadian nurses' occupation may account for their higher prevalence of back problems and work stress. At the same time, their occupation may motivate flu immunization, cervical cancer screening, and vegetable and fruit consumption. Some problematic aspects of nurses' health profile are similar to those of other educated women.

Keywords

health behaviour, health surveys, occupational health, preventive practices, risk factors

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Research on the health of Canadian nurses has revealed a number of areas of concern. Nurses face occupational health hazards that include exposure to infectious diseases, biological hazards and carcinogens; psychological demands; and shift work.[1-4] A study commissioned by Health Canada's Office of Nursing Policy found that registered nurses who were employed full-time had an illness- and injury-related absenteeism rate 83% higher than that of other occupational groups.[5] This level of absenteeism raises questions about nurses' health, the environments in which they work, the work they do and how it is organized, and the cost to the system in lost time—an estimated 19.6 million hours (about 11,000 full-time equivalents) in 2002.[5]

In 2005, the National Survey of the Work and Health of Nurses was conducted with a focus on their health status and working conditions. Comparisons of the survey results with the health status of employed Canadians aged 21 or older revealed an excess risk of back problems and arthritis, pain severe enough to prevent activities of daily living, and depression among nurses.[3]

By contrast, in a 2007 study of mortality and cancer risks among British Columbia nurses, Dimich-Ward et al.[4] found that, compared with the general population of women in the province, female registered nurses were at lower risk of all-cause, cardiovascular-related, and cancer mortality. And with the exception of malignant melanoma, the nurses had a lower incidence of cancer. The authors speculated that these relatively good health outcomes for nurses arose from a "healthy worker effect," and possibly, better uptake of cancer screening programs and healthy lifestyles.

Much of the research on nurses' health has analytical limitations. The occupational health information has often come from time-loss claims collected by workers' compensation boards, which are biased through underreporting.[6] And although some of these claims are made for stress-related health problems and infectious diseases, the vast majority are for physical injury. Further, they are confined to incidents reported and judged to be work-related and are typically "acute" or sudden in onset.[7] Analyses of administrative databases and registries, if comparisons with referent groups are made, do not include information about employment status, and thus, are frequently limited to comparisons with the "general public," which, as in the case of the Dimich-Ward et al. study,[4] are biased by the "healthy worker effect." This occurs because the general public includes people who are not employed owing to illness or disability; consequently, this referent group tends to have poorer overall health than people who are employed (in this case, nurses).[8] Also, when comparing nurses' health with that of other employed people, it is preferable to control for confounding factors such as differences in age, socio-economic status, place of residence and lifestyle. In the report of the 2005 National Survey of the Work and Health of Nurses, which compared nurses' health with the health of other employed people based on data from another survey, such adjustments could not be made.[2]

Several theories (for example, the Health Belief Model, the Theory of Planned Behavior, and the Precaution Adoption Process Model[9-11]) describe the predisposing, enabling and reinforcing factors that shape health behaviour, and ultimately, health status.[12] Understanding factors associated with nurses' health status and behaviour—that is, whether health deficits arise from occupational, personal or environmental factors—is important. This is particularly relevant now when the number of employed nurses is not keeping pace with population growth, the average age of the nursing workforce is rising, and concerns about retention are mounting.[13]

The purpose of this study is to compare the health status of nurses with that of other employed female postsecondary graduates, focusing on perceived health status, disease prevention, behavioural risk and protective factors, and psychosocial risk factors. This analysis overcomes some of the limitations of other studies by providing an appropriate referent group and by adjusting for important demographic and socio-economic confounders.

The analysis in this article, based on the 2003 Canadian Community Health Survey, contrasts the health of female nurses with that of other postsecondary-educated women who had been employed at some time during the previous 12 months and whose occupations were not likely to have involved exposure to the hospital environment. At some point in their career, all nurses have been exposed to the hospital environment. While many may not be currently employed within a hospital setting (for example, community-based nurses, researchers, educators), all nurses were included in this study to avoid a selection bias that would result if the sample was limited to current hospital-based nurses. In fact, some nurses may have left hospital positions precisely because of relevant exposures and resulting health problems. As well, the lag time between exposure and the development of health problems may be considerable.

Data and methods

Data source

The analyses are based on cross-sectional data from cycle 2.1 of the 2003 Canadian Community Health Survey.[14] Every two years, the Canadian Community Health Survey collects data about Canadians' health status, health services use and health determinants. The survey covers 98% of household residents aged 12 or older in all provinces and territories. It excludes institutional residents; members of the regular Canadian Forces; residents of Indian reserves, Crown Lands and remote areas; and all residents (military and civilian) of Canadian Forces bases.

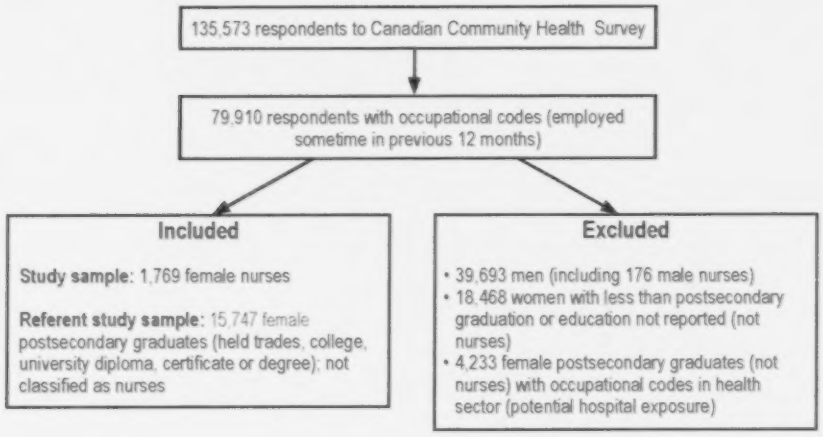
Three sampling frames were used for household selection: an area frame (48%), a list of telephone numbers (50%), and a random-digit-dialling frame (2%), which stemmed from a stratified cluster design. The 2003 sample, obtained over 11 months, consisted of 135,573 respondents for an estimated 80.7% response rate. Interviews were conducted face-to-face and by telephone. In 2.4% of cases, a proxy respondent (a knowledgeable household member) was interviewed.

Two study samples were selected from the 79,910 respondents to the 2003 Canadian Community Health Survey who were assigned occupational codes based on the 1991 Standard Occupational Classification (that is, they had been employed at least some time in the previous 12 months).[15]

The first study sample consisted of female nurses. For cycle 2.1 of the Canadian Community Health Survey, Health Canada's Office of Nursing Policy contracted to have nine supplementary questions asked of respondents who indicated that they were managers in health care, head nurses or supervisors; registered nurses; registered nursing assistants; or college or other vocational nursing instructors. They were asked, "Are you registered or licensed as a ... registered nurse? Registered psychiatric nurse? Licensed practical nurse?" Those who answered affirmatively were asked about their working conditions. A total of 1,945 survey respondents (1.4%) were coded as nurses, 91.0% (1,769) of whom were women. The analysis was limited to female nurses because estimates based on the small number of male nurses would have been unreliable. According to their occupational codes, 65.2% were registered nurses; 19.2% were registered nursing assistants; 8.2% were managers in health care, head nurses or supervisors; and 7.4% were college or other vocational instructors.

The second study sample (the referent group) consisted of female postsecondary graduates (held a trade or

Figure 1
Study samples


135,573 respondents to Canadian Community Health Survey
79,910 respondents with occupational codes (employed sometime in previous 12 months)
Included
Study sample: 1,769 female nurses
Referent study sample: 15,747 female postsecondary graduates (held trades, college, university diploma, certificate or degree); not classified as nurses
Excluded
• 39,693 men (including 176 male nurses)
• 18,468 women with less than postsecondary graduation or education not reported (not nurses)
• 4,233 female postsecondary graduates (not nurses) with occupational codes in health sector (potential hospital exposure)

Source: 2003 Canadian Community Health Survey

college diploma, or university certificate or degree), 29,315 of whom were not classified as nurses. Of these, 9,335 were not assigned occupational codes (because they had not worked in the past year, refused to provide the information, or the information provided could not be coded) and were excluded from the study. To restrict the potential risk of hospital exposure to female nurses, an additional 4,233 women who were in occupations that might have been employed by hospitals or who had been assigned occupational codes in the health sector were excluded from the referent group (Appendix Tables A and B). Thus, 1,769 female nurses and 15,747 women with postsecondary credentials, representing 329,020 and 3,411,108 women, respectively, were included in the analysis (Figure 1).

Analytical techniques

Cross-tabulations were produced to examine associations between the health indicators and membership in the two study groups. Odds ratios with 95% confidence intervals were calculated to estimate the magnitude of the associations. Multiple logistic regression analyses were conducted to estimate the same associations with the addition of all covariates to adjust the odds ratios for potential confounding. Because data were missing on some items (ranging from 0% to 7.7% missing for total household income), multiple imputation, based on Rubin's procedure, was used to create five data sets with imputed values.[16,17] The five data sets were analyzed according to the procedures described above, and the results were combined following Rubin's guidelines; this approach results in statistically valid inferences that appropriately reflect the uncertainty associated with missing values.[18]

All confidence intervals were computed with the program Bootvar 3.1, developed by Statistics Canada, using the bootstrap resampling technique with 500 bootstrap weights, to take into account the complex clustered and stratified survey design effects.[19] All statistical analyses were conducted with the SAS (v. 8.2) statistical software package.[20] Significance was established as a 95% confidence interval not spanning unity. With groups the size of those studied here, a 95% confidence level, and desired power of 80%, it is possible to detect a difference in prevalence rates as small as 3.5% (corresponding to an odds ratio of 1.15). In the multivariate analyses, assuming a coefficient of multiple correlation of no more than .25 between the exposure of interest (female nurses versus other postsecondary graduates) and the covariates, there would be more than 80% power to detect an odds ratio of at least 1.20.[21]

Measurement

Self-reported general health was assessed with the question, "In general, would you say your health is..." Responses were grouped: "excellent or very good" = 0 and "good, fair or poor" = 1. *Self-reported mental health* was determined with the question: "In general, would you say your mental health is..." Responses were grouped: "excellent or very good" = 0 and "good, fair, or poor" = 1. To determine the presence of *chronic conditions*, the interviewers stated, "Now I'd like to ask about certain chronic health conditions which you may have. We are interested in 'long-term conditions' which are expected to last or have already lasted six months or more and that have been diagnosed by a health professional." Questions were asked about 30 specific conditions, along with a summary question: "Do you have any other long-term physical or mental health condition that has been diagnosed by a health professional?" The conditions examined in this analysis are: "has a chronic condition," "asthma," "arthritis or rheumatism (excluding fibromyalgia)," "back problem (excluding fibromyalgia and arthritis)" and "high blood pressure." These were the most prevalent conditions; all others affected fewer than 5% of one or both study groups.

Participation in *disease prevention* was assessed through three questions: "Have you ever had a flu shot?"; "Have you ever had a pap smear test?"; and "Have you ever had a mammogram, that is, a breast x-ray?" The last question was asked of 62.2% of participants (women younger than 35 were not asked). Responses were coded: "no" = 0 and "yes" = 1.

Behavioural risk factors were weight, physical inactivity, insufficient daily

fruit and vegetable consumption, heavy alcohol use, and current smoking. Based on self-reported height and weight, respondents' body mass index was calculated (weight in kilograms divided by height in metres squared) and classified as "*overweight or obese*" = 1, if it was 25.0 or more. Respondents were classified as *physically inactive* based on a measure of average daily energy expended during leisure time in the previous three months. They were asked if they had participated in any of more than 20 activities. Statistics Canada assigned a MET value (metabolic energy cost, expressed as a multiple of the resting metabolic rate) to each activity. Each activity has a range of potential energy expenditures; Statistics Canada applied the lowest intensity value for each one. For example, walking for exercise was assigned a MET value of 3 kilocalories per kilogram per hour, which means that the activity requires three times the amount of energy expended when resting. Daily energy expenditure was calculated as the number of times a respondent engaged in an activity over the three-month period, multiplied by the average duration of the activity (in hours), multiplied by the activity's MET value. These scores were divided by 365 to obtain daily values. A daily energy expenditure of 1.5 would result, for example, from a 30-minute walk every day.[22] Participants whose energy expenditure was less than 1.5 kcal/kg/day were classified as "inactive" = 1.[14] *Insufficient daily vegetable and fruit consumption* was derived from a series of questions about the frequency of consuming fruit juice, fruit, green salad, potatoes, carrots, and other vegetables. Those who reported consuming vegetables and fruit less than five times a day were classified as having insufficient consumption, according to the recommendation in effect at the time of the survey, the 1992 *Canada's Food Guide to Healthy Eating*.[23] *Current smokers* were defined as those who smoked cigarettes daily or occasionally. *Heavy alcohol use* was derived from the question, "How often in the past 12 months have you had 5 or more drinks on one occasion?" Those who responded "once a month" or more were classified as having heavy alcohol use.

Table 1
Demographic and socio-economic characteristics of nurses and referent group, female household population, Canada excluding territories, 2003

Characteristics	Female nurses	Referent group	χ^2 statistic (df)[1]	Missing before imputation
	----------Percentage----------			Percentage
Marital status				
Married/Common-law	74.8	67.7	71.2 (2)***	0.0
Widowed/Divorced/Separated	10.7	10.4		
Single	14.5	23.9		
Urban dweller				
Yes	79.7	84.4	22.5 (1)***	0.0
No	20.3	15.6		
Usual work schedule				
Regular daytime	42.1	77.2	1800.3 (4)***	0.1
Regular evening/night	14.2	4.9		
Rotating shift	34.6	6.0		
Irregular shift	6.1	9.2		
Split/On-call/Other	3.1	2.6		
Total personal income				
Less than $20,000	8.6	25.8	358.9 (3)***	7.4
$20,000 to $34,999	23.4	28.5		
$35,000 to $49,999	30.5	23.7		
$50,000 or more	37.6	22.0		
Total household income				
Less than $40,000	9.6	16.9	130.3 (3)***	7.7
$40,000 to $59,999	12.9	19.0		
$60,000 to $79,999	22.9	22.4		
$80,000 or more	54.7	41.7		
Household size				
1	10.3	10.8	0.7 (3)***	0.0
2	30.9	31.3		
3	21.3	21.4		
4 or more	37.5	36.5		
Immigrant				
Yes	14.4	20.7	35.3 (1)***	0.1

[1] continuity correction used for 2 * 2 tables
*** $p < 0.001$
Notes: The referent group is female postsecondary graduates employed in past year in occupations other than those in health sector or employed by hospitals. All estimates are weighted using bootstrapped sampling weights after multiple imputation for missing data.
Source: 2003 Canadian Community Health Survey.

Psychosocial risk factors were *perceived life stress* and *perceived work stress* and were derived from the questions: "Thinking about the amount of stress in your life, would you say that most days are..." and "Would you say that most days at work were..." The response options were: "not at all stressful," "not very stressful," "a bit stressful," "quite a bit stressful," and "extremely stressful." Those who responded "quite a bit stressful" or "extremely stressful" were compared with those who chose one of the other options.

Several demographic and socioeconomic factors were treated as potential confounders. The variables entered as continuous were: age in years; total usual number of hours worked per week; total personal income before taxes and other deductions from all sources in past 12 months; total household income from all sources in past 12 months; and household size. Other factors were entered as categorical variables. Three

marital status categories were used: married or common-law; widowed, divorced or separated; and single. Urban dweller was coded: yes, urban or no, rural. Usual work schedule described the hours the respondents usually worked: regular daytime schedule or shift; regular evening or night shift; rotating shift (change from days to evening to nights); irregular schedule; and split shift, on call or other. Immigrant status was coded "yes" or "no."

Results

Demographic and socio-economic characteristics

The female nurses were almost 4 years older, on average, than other employed female postsecondary graduates: 42.9 years (95% CI: 42.2-43.7) versus 39.0 years (95% CI: 38.8-39.2; Z = 9.3, p < .001), and usually worked about one hour less per week: 36.3 hours (95% CI: 35.5-37.2) versus 37.4 hours (95% CI: 37.0 – 37.7; Z = -2.2; p = .029). Compared with other employed female postsecondary graduates, the nurses were more likely to be married or in common-law relationships, rural dwellers, shift workers, and Canadian-born (not immigrants), and had higher personal and household income (Table 1).

Health status

Nurses' and other employed female postsecondary graduates' ratings of their health were similar (Table 2). Among nurses, 28.9% rated their general health as good, fair or poor, rather than excellent or very good; the corresponding figure for other employed women with postsecondary credentials was 31.1%. The percentages rating their mental health as good, fair or poor were 18.1% and 20.4%, respectively. And while the nurses were more likely to report a chronic condition (74.4% versus 69.6%), this excess risk disappeared when the confounding effects of age, work schedule, income, household size and immigrant status were taken into account. The nurses, however, were more likely to report back problems (excluding fibromyalgia and arthritis), a difference that remained statistically significant when controlling for the influence of confounders.

Disease prevention

Being a nurse was associated with engaging in preventive behaviour. A much higher percentage of nurses than other employed female postsecondary graduates had had flu shots (68.2% versus 38.8%) (Table 2), an association that persisted in the multivariate analysis (Table 3). Similarly, the nurses were more likely to have ever had a pap smear (97.4% versus 91.0%), even when potential confounders were taken into account. One in two nurses (49.8%) had had a mammogram, compared with 36.0% of the referent group, but the association was not significant in the multivariate analysis.

Behavioural risk factors

The nurses were more likely than the referent group to be classified as overweight or obese (43.9% versus 34.4%). Nurses' excess risk, however, became statistically non-significant after adjustment for age, place of residence, work schedule, income, household size and immigrant status (Table 3).

Table 2
Health status of nurses and referent group, female household population, Canada excluding territories, 2003

Characteristics	Female nurses	Referent group	Missing before imputation
	Percentage		
Self-reported health			
General health			
Excellent/Very good	71.2	68.9	0.0
Good/Fair/Poor	28.9	31.1	
Mental health			
Excellent/Very good	81.9	79.6	0.4
Good/Fair/Poor	18.1	20.4	
Chronic conditions			
At least one	74.4	69.6	0.1
Asthma	9.1	9.3	0.0
Arthritis/Rheumatism (excluding fibromyalgia)	14.2	12.1	0.1
Back problems (excluding fibromyalgia and arthritis)	24.0	20.0	0.1
High blood pressure	11.6	7.1	0.1
Disease prevention			
Ever had flu shot	68.2	38.8	0.5
Ever had pap smear	97.4	91.0	0.7
Ever had mammogram[†]	49.8	36.0	0.5
Behavioural risk factors			
Overweight/Obese[‡]	43.9	34.4	6.2
Physically inactive in leisure time[§]	47.2	47.3	0.4
Less than 5 servings of fruit/vegetables per day	40.1	50.2	1.9
Current smoker (daily or occasional)	18.9	19.7	0.1
Heavy alcohol use[¶]	6.9	11.0	0.0
Psychosocial risk factors			
Perceived life stress			
Quite a bit or extremely	31.4	31.7	0.1
Perceived work stress			
Quite a bit or extremely	55.8	34.9	1.9

† asked of 62.2% of women in sample (women younger than 35 not asked)
‡ body mass index 25 or more
§ total daily energy expenditure less than 1.5 kcal/kg/day
¶ five or more drinks on one occasion at least once a month

Notes: The referent group is female postsecondary graduates employed in past year in occupations other than those in health sector or employed by hospitals. All estimates are weighted using bootstrapped sampling weights after multiple imputation for missing data.

Source: 2003 Canadian Community Health Survey.

About half the women in both groups were physically inactive (47.2% of nurses versus 47.3% of other employed postsecondary graduates). Nurses were less likely to report insufficient consumption of vegetables and fruit (40.1% versus 50.2%) or heavy alcohol use (6.9% versus 11.0%), even when allowing for the influence of the covariates. The prevalence of smoking was almost the same in the two groups (about 19%).

Psychosocial risk factors

No group differences were noted in the percentages of women reporting that most days were "quite a bit" or "extremely" stressful (about 31%). However, when the question was specific to work stress, the nurses were more likely (55.8% versus 34.9%) to say that most days were "quite a bit" or "extremely" stressful, with minimal confounding by the demographic differences in the populations (Table 3).

Discussion

The present study profiles the health status of Canadian female nurses and compares it with that of other women with postsecondary credentials who were employed in non-hospital occupations. The two groups were similar with respect to their overall self-reported physical and mental health and their risks of being diagnosed with asthma, arthritis or rheumatism, and high blood pressure. However, even when differences in demographic and socio-economic characteristics were taken into account, being a nurse was associated with a greater risk of reporting back problems. The nurses were also more likely to have ever had a flu shot or a pap smear.

The prevalence of smoking and being physically inactive was similar in the two groups. The nurses, however, were significantly less likely to report insufficient vegetable and fruit consumption or heavy alcohol use. And while similar percentages of women in the two groups reported their lives to be "quite a bit" or "extremely" stressful, nurses were significantly more likely to describe their days at work as stressful.

Because of differences in the variables studied and in approaches to measurement, few comparisons can be made with the findings of the 2005 National Survey of the Work and Health of Nurses.[3] Nonetheless, the prevalence estimates for asthma, arthritis, back problems, high blood pressure, and overweight/obesity are remarkably congruent. A noteworthy exception is the prevalence of smoking among nurses: 18.9% in this analysis versus 15.8% in the National Survey of the Work and Health of Nurses.

The 2005 survey, which made comparisons with "employed Canadians

Table 3
Unadjusted and adjusted odds ratios relating health status of nurses to that of referent group, female household population, Canada excluding territories, 2003

Characteristics	Unadjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval	
		from	to		from	to
Self-reported health						
General health						
Excellent/Very good	1.00			1.00		
Good/Fair/Poor	0.90	0.75	1.07	0.86[a,e,g,h,i]	0.70	1.05
Mental health						
Excellent/Very good	1.00			1.00		
Good/Fair/Poor	0.86	0.72	1.04	0.88[c,g]	0.71	1.08
Chronic conditions						
At least one†	1.27*	1.06	1.52	1.04[a,e,f,h,i]	0.86	1.27
Asthma†	0.98	0.77	1.26	0.92[d,g,i]	0.70	1.21
Arthritis/Rheumatism (excluding fibromyalgia)†	1.20	0.96	1.50	0.93[a,c,f,g,i]	0.71	1.20
Back problems (excluding fibromyalgia and arthritis)†	1.26*	1.05	1.52	1.24*[a,b,c,f,i]	1.01	1.53
High blood pressure†	1.72*	1.34	2.21	1.24[a,g]	0.93	1.65
Disease prevention						
Ever had flu shot†	3.38*	2.87	3.97	3.10*[a,c,d,f]	2.56	3.76
Ever had pap smear†‡	3.70*	2.44	5.61	2.24*[a,c,g,h,i]	1.43	3.50
Ever had mammogram†‡	1.76*	1.51	2.06	1.05[a,c]	0.79	1.39
Behavioural risk factors						
Overweight/Obese†§	1.49*	1.27	1.75	1.15[a,d,e,g,h,i]	0.95	1.39
Physically inactive in leisure time†††	0.99	0.84	1.17	1.05[c,d,e,g,h,i]	0.87	1.26
Less than 5 servings of fruit/vegetables per day†	0.67	0.57	0.78	0.69*[a,c,e]	0.58	0.83
Current smoker (daily or occasional)†	0.96	0.78	1.17	0.86[b,c,e,i]	0.66	1.11
Heavy alcohol use†‡‡	0.59*	0.44	0.80	0.57[a,c,d,e,g,h,i]	0.40	0.80
Psychosocial risk factors						
Perceived life stress						
Quite a bit or extremely†	0.99	0.84	1.16	0.97[a,b,c,f,h]	0.81	1.16
Perceived work stress						
Quite a bit or extremely†	2.36	2.02	2.75	2.25*[b,e,f]	1.88	2.70

† reference category; reference category is "No" for all binary characteristics
* significantly different from reference category ($p < 0.05$)
‡ asked of 62.2% of women in sample (women younger than 35 not asked)
§ body mass index 25 or more
†† total daily energy expenditure less than 1.5 kcal/kg/day
‡‡ five or more drinks on one occasion at least once a month

Notes: The referent group is female postsecondary graduates employed in past year in occupations other than those in health sector or employed by hospitals. All estimates are weighted using bootstrapped sampling weights after multiple imputation for missing data. Adjusted for (a) age, (b) total usual hours worked/week, (c) marital status, (d) urban/rural dweller, (e) usual work schedule, (f) total personal income, (g) total household income from all sources, (h) household size, and (i) immigrant status.

Source: 2003 Canadian Community Health Survey.

What is already known on this subject?

- Past research has suggested that Canadian nurses' illness- and injury-related absenteeism rates are considerably higher than those of other occupational groups.
- Nurses have been reported to be at risk for back problems, arthritis, pain and depression.
- Compared with the general population, nurses have been found to be at lower risk of all-cause, cardiovascular-related, and cancer mortality.
- Much of the research is limited because of underreporting, comparisons with the general public that are influenced by the "healthy worker effect," and failure to adjust for confounding factors such as age, socio-economic status and place of residence.

What does this study add?

- In some respects, female nurses' occupation appears to confer some health risks and benefits.
- Nurses are more likely than other employed female postsecondary graduates to report work stress and back pain.
- Nurses are more likely to have had flu shots and pap tests, and are less likely to report excessive alcohol consumption.
- As is true of other employed women, substantial percentages of female nurses are overweight/obese, are physically inactive, consume vegetables and fruit infrequently, and smoke.

overall," concluded that female nurses were more likely to have back problems, again, a finding consistent with the data reported in this study. However, according to the results of that survey, female nurses were more likely to have arthritis and less likely to smoke, differences that were not found in the comparison with employed female postsecondary graduates. And whereas the analysis of data from the National Survey of the Work and Health of Nurses found that nurses were more likely than employed Canadians overall to have high blood pressure, in this study, female nurses were at similar risk of high blood pressure once differences in age and income were controlled.

Limitations

The present study has some limitations. Because of the small number of male nurses in the survey sample, the analysis examined only female nurses. It is possible that the health status of male nurses is different.

The use of self-reports is typically considered error-prone. Moreover, the error associated with these data may have a differential bias because nurses' reporting patterns could be influenced by their specialized knowledge of health conditions and risks.

To facilitate the comparisons, some health indicators were collapsed into binary variables. This may have resulted in the loss of information.

Causal inferences should not be made because the temporality of the predictor and outcome variables is not known, and potential confounders that were not examined here may account for the associations between occupation and health behaviour or status.

Conclusion

Although occupation was not associated with many of the health indicators examined here, some health problems and risks were relatively more prevalent among nurses, notably, back problems and reports that work was "quite a bit" or "extremely" stressful. Like other employed female postsecondary graduates, female nurses were at risk of disease because of overweight/obesity, physical inactivity during leisure time, insufficient fruit and vegetable consumption, and smoking.

As is the case for most people, the health profile of Canadian female nurses is complex and somewhat contradictory. Some aspects of their behaviour are health-promoting, while others are of potential concern. ■

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Appendix

Table A
Occupations of other postsecondary graduates

Standard Occupational Classification code	Occupation	Number	Percentage
Total		**15,747**	**100.0**
A	Management occupations	1,353	8.6
B	Business, finance and administrative occupations	4,414	28.0
C	Natural and applied sciences and related occupations	743	4.7
D	Health occupations[†]	174	1.1
E	Occupations in social science, education, government service and religion	2,987	19.0
F	Occupations in art, culture, recreation and sport	969	6.2
G	Sales and service occupations	4,056	25.8
H	Trades, transport and equipment operators and related occupations	329	2.1
I	Occupations unique to primary industry	331	2.1
J	Occupations unique to processing, manufacturing and utilities	391	2.5

[†] veterinarians (D014), optometrists (D021), chiropractors (D022), veterinary and animal health technologists and technicians (D213), denturists (D221), dental technologists, technicians, and laboratory bench workers (D223) opticians (D231), and dental assistants (D311)

Table B
Occupations *not* included among other postsecondary graduates

Standard Occupational Classification code	Examples of occupations excluded	Number	Percentage
Total		**4,233**	**100.0**
A321	Managers in health care	36	0.9
B213, B214, B411, B513, B514, B541, B553, B572	Medical secretaries; recorders and medical transcriptionists; records and file clerks; receptionists and switchboard operators; administrative clerks	1,355	32.0
C021, C041, C048, C111, C121	Biologists and related scientists, other professional engineers; applied chemical technologists and technicians; biological technologists and technicians	87	2.1
D011-D013, D023, D031, D032, D041-D044, D211, D212, D214-D217, D219, D222, D232, D234, D235, D312, D313	Specialist physicians; general practitioners and family physicians; dentists; pharmacists; dietitians and nutritionists; audiologists and speech-language pathologists; physiotherapists; occupational therapists; medical laboratory technologists and pathologists' assistants; respiratory therapists, clinical perfusionists and cardio-pulmonary technologists; medical radiation technologists; cardiology technologists, midwives	1,624	38.4
E021-E024	Psychologists; social workers; ministers of religion	394	9.3
G012-G015, G811, G931, G933, G951, G961, G962, G981, G982	Food service supervisors; cleaning supervisors; light duty cleaners; janitors, caretakers and building superintendents; elemental medical and hospital assistants; kitchen and food service helpers; laundry occupations	737	17.4